138,144

PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

Improvements relating to Medical and Dental Syringes.

I, ABRAM LIPMAN OSTROV, of Russell House, Middleton Street, Llandrindod Wells, Wales, Dental Practitioner, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to medical and dental syringes particularly of the hypodermic type and has for its object to provide an improved construction of syringe which shall be more convenient and satisfactory in operation than those hitherto devised.

The principal feature of the invention relates to the construction of the piston or plunger whereby improved arrangements for filling the syringe with the liquid to be injected are provided.

The invention contemplates as has previously been proposed the introduction of the liquid into the barrel of the syringe through the stem of the piston or plunger which for this purpose is provided with one or more valves.

According to the present invention the valve or valves is or are arranged, during the charging of the syringe with liquid, to be positively maintained open against the action of a spring or springs.

In order that the nature of the invention may be clearly understood a preferred construction of hypodermic syringe embodying the invention will now be described by way of example with reference to the accompanying drawings of which:

Figure 1 is a sectional view of the syringe and

Figure 2 illustrates the method of filling.

Referring now to the drawings, the improved hypodermic syringe consists of a glass cylinder or barrel 1 surrounded by an outer casing or guard 2 provided with openings or windows 3 in the usual manner and may or may not be graduated.

The piston of the syringe comprises a cylindrical element 4 constructed in two parts between the flanged ends of which a packing indicated at 26 is secured. The piston rod or stem 5 is of tubular construction as indicated in Figure 1 being secured to a tubular extension 31 of the outer portion 4 of the piston. The piston rod 5 terminates outside the barrel casing 2 in a suitable handle or head 6 by means of which the piston is reciprocated within the barrel.

One end of the barrel 1 is provided with a cylindrical plug 7, the upper end of which is screw-threaded on to a nozzle 9, an axial passage 8 in which establishes communication between the interior of the barrel 1 and the nozzle 9,

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a suitable washer or gasket 27 being interposed between a flange on the nozzle and the outer end of the plug 7. The latter is provide l adjacent to its opposite end with an annular groove containing a packing ring 28 of rubber or other suitable material. Located in the axial passage 8 is a ball valve 10 provided with a valve seating 29 of rubber or leather this valve being normally retained on its seating by means of a light spring 30 as shown in Figure 1. The opposite end of the barrel 1 is closed by means of a similar cylindrical plug through which the piston rod 5 passes forming a fluid-tight joint. The outer casing 2 of the syringe terminates at this end of the barrel in a cap 11 provided with curved arms 12. Located in the interior of the piston 4 is a conical valve 13 adapted to co-operate with a suitable valve seating, the valve 13 being provided with a valve stem 14 situated axially within the tubular piston stem 5. Adjacent to the handle 6 the valve stem 14 is provided with a conical enlargement 15 constituting a second valve adapted to engage with a valve seating formed on the inner face of a cylindrical bushing 16. Interposed between the end of the valve stem 14 and the outer end of the bushing 16 is a ball 17 adapted to register with an inlet passage 18 the outer end of which is closed by a pivoted flap or cover 20. The valve stem 14 is for the greater part of its length surrounded by a tube 21 and a helical spring 22 surrounding the tube 21 serves normally to retain the valves 13 and 15 on their respective seatings.

The operation of filling the syringe is illustrated in Figure 2 and is as follows:—

The piston 4 of the syringe is first pushed inwards to its full extent and the syringe is then placed with its nozzle end upwards on a bottle 23 containing the liquid with which the syringe is to be charged. An outlet pipe 24 provided with a suitable nozzle 25 projects from the bottle 23 and fits closely within the inlet passage 18 of the syringe, the cover 20 being turned aside for this purpose. The nozzle 25, when the syringe is in position for filling, engages with the ball 17 and raises the latter which in turn raises the valve stem 14 thus lifting the valves 13 and 15 from their seatings. The piston stem 5 being now held firmly in position on the nozzle 25 by means of the handle 6, the barrel 1 is now raised by means of the arms 12 until the piston 4 is at the opposite end of the barrel 1.

The suction exerted by the piston 4 causes the liquid in the bottle 23 to pass into the barrel 1 through the pipe 24, nozzle 25, passage 18 past the valve 15, through the tube 21 and finally past the valve 13.

The charged syringe is now removed from the bottle 23, and the valves 13 and 15 resume their closed positions under the action of the spring 22.

The syringe may now be employed for injection in the usual manner, the liquid contained in the barrel 1 being expelled by means of the piston 4 past the ball valve 10 and through the nozzle 9 and the hypodermic needle attached thereto.

It will be understood that the ball valve 10 is provided for the purpose of preventing air entering the barrel 1 during the charging operation.

The nozzle of the syringe may be of any preferred type but is preferably that described in the Specification of Letters Patent No. 104,537, but in the case of syringes as adapted for dental work it is preferable to extend the tubular projection considerably from the end cap upon which the nozzle fits so that in operation the point of the hypodermic needle is sufficiently distant from the nozzle end of the syringe to enable the latter to be employed without introducing any portion of the syringe into the mouth of the patient where it is liable to obstruct the view of the operator.

As will be apparent from the above description that since the valves 13 and 15 are arranged to be positively opened by the action of the pipe 24 in filling the syringe the spring 22 can be of considerable strength thereby insuring perfect closure of the valves 13 and 15 when the latter are released as the

syringe is removed after filling so that leakage from the syringe barrel past the valves is effectively prevented. Again the provision of the auxiliary valve 15 adjacent to the handle or head 6 of the syringe serves to retain within the body of the syringe practically all the liquid introduced therein.

In a modified construction the valves 13 and 15 may be replaced by a single valve which is preferably located in the head of the piston 4 and thus corresponds to the valve 13. The valve stem 14 is in this case a straight rod extending down to the ball 17.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. A medical or dental syringe comprising a tubular piston rod or stem through which the barrel of the syringe is arranged to be charged with liquid and containing one or more valves for preventing escape of this liquid in which the valve or valves is or are arranged, during the charging of the syringe with liquid, to be positively maintained open against the action of a spring or springs, for the purpose specified.

2. A medical or dental syringe comprising a piston having a tubular rod or stem constructed arranged and operating substantially as described with reference to the accompanying drawings.

3. The method of charging a medical or dental syringe of the kind specified in Claim 1 substantially as described with reference to Figure 2 of the accompanying drawings.

Dated this 30th day of June, 1919.

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65, Victoria Street, Westminster, S.W. 1.

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138,144. OSTROV'S COMPLETE SPECIFICATION.

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1.

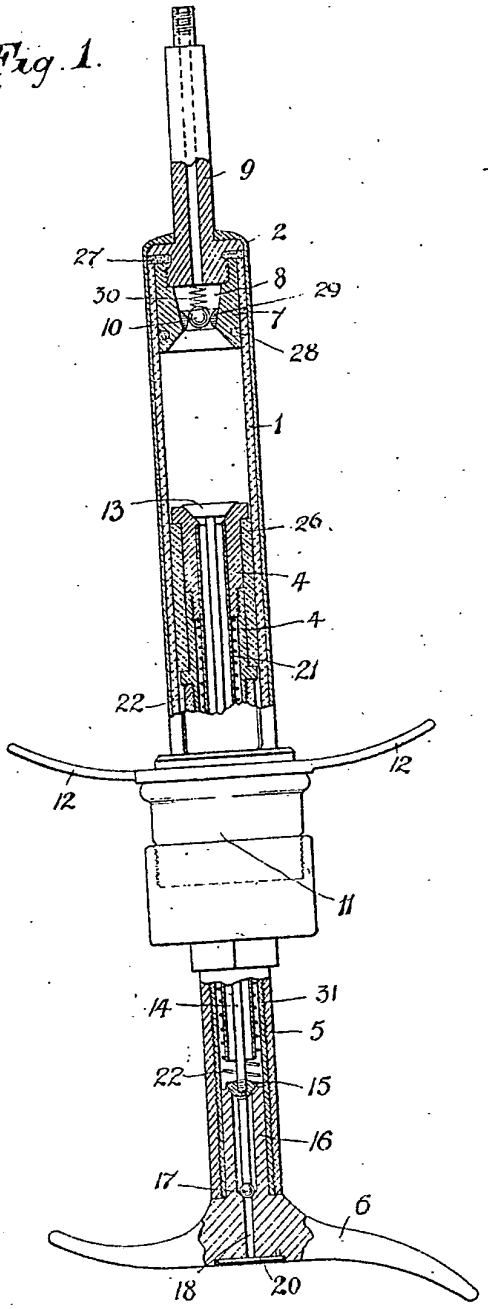
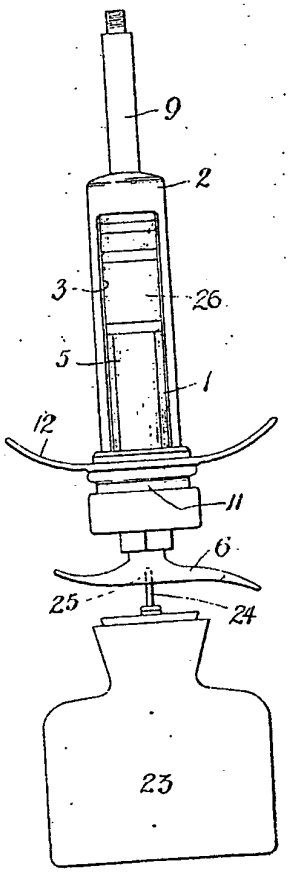


Fig. 2.



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